

Chapter XIV

Retrieval Optimization for Server-Based Repositories in Location-Based Mobile Commerce

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ABSTRACT

Location-based mobile commerce (LBMC) incorporates location-aware technologies, wire-free connectivity, and server-based repositories of business locations to support the processing of location-referent transactions (LRTs) between businesses and mobile consumers. LRTs are transactions in which the location of a business in relation to a consumer's actual or anticipated location is a material transactional factor. Providing adequate support for LRTs requires the timely resolution of queries bearing transaction-related locational criteria. The research reported here evaluates and extends the author's location-aware method (LAM) of resolving LRT-related queries. The results obtained reveal LAM's query resolution behavior in a variety of simulated LBMC circumstances and confirm the method's potential to improve the timeliness of transactional support to mobile consumers. The article also identifies and evaluates a heuristic useful in maintaining optimal query resolution performance as changes occur in the scale and scope of server-based repositories.

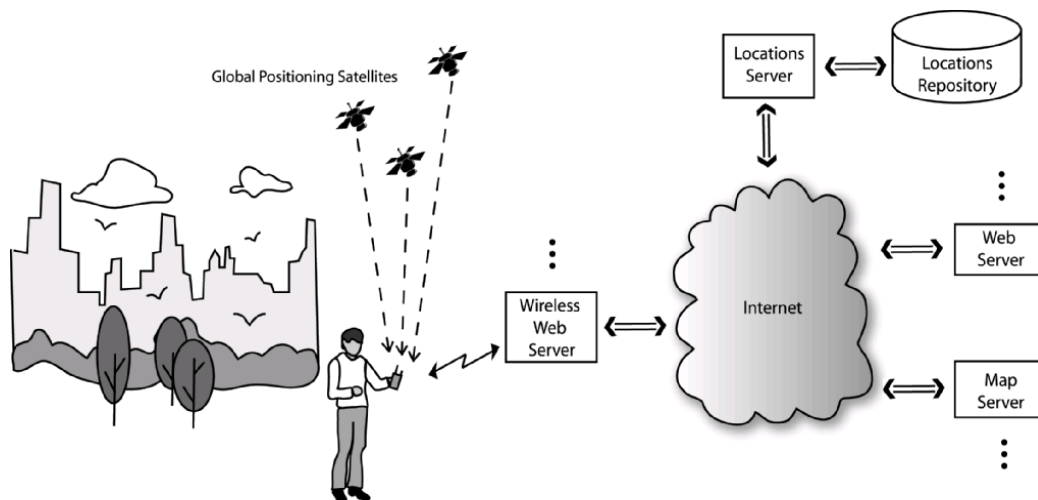
INTRODUCTION

Recent years have witnessed the emergence of transaction-supporting devices directed toward the mobile consumer. Devices range from simple handsets in mobile/cellular phone systems to those involving the convergence of palm-top computing, location-determining technologies, and wireless Internet connectivity. To support applications in location-based mobile commerce (LBMC), such devices must incorporate communication capabilities that permit a significant degree of consumer mobility (Leung and Atypas, 2001; Santami, Leow, Lim, and Goh, 2003) and they must be location-aware. Location-awareness refers to the capability of a device to obtain data about geographical position and then use the data to manipulate information with respect to that position (Butz, Bauss, and Kruger, 2000). Yuan and Zhang (2003) suggest that “location awareness [adds an important] new dimension for value creation” in mobile commerce. Figure 1 illustrates an LBMC context in which location-aware client

applications operating on mobile, GPS-enabled, handheld computing devices avail of wireless connectivity to access a variety of Internet-based servers providing information and functionality to support the transactional activities of a mobile consumer.

An essential component in large-scale, location-aware, mobility-supporting applications is a specialized database (repository) of transaction-supporting information (note Figure 1’s Locations Repository). Repository content supports the resolution of queries associated with location-referent transactions (LRTs). LRTs are transactions in which the location of a business in relation to a consumer’s actual or anticipated location is a material transactional factor. Siau, Lim and Shen (2001) and later Siau and Shen (2003) call for research on improving the processing of transactional queries in circumstances “where users are constantly on the move and few [end user device] computing resources are available” (p. 13). The research reported here responds to this call: it is concerned with the timely process-

Figure 1. Location-based mobile commerce – Configuration of components



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